Fisheries Research 183 (2016) 192–199

Contents lists available at ScienceDirect

Fisheries Research

journal homepage: www.elsevier.com/locate/fishres

Seal bycatch in gillnet and entangling net fisheries in Irish waters

Ronan Cosgrove[a,*], Martha Gosch[b], David Reid[c], Michael Sheridan[a], Nicolas Chopin[a], Mark Jessopp[b], Michelle Cronin[b]

[a] Irish Sea Fisheries Board (BIM), New Docks, Galway, Ireland
[b] MaREI Centre, Environmental Research Institute, University College Cork, Cork, Ireland
[c] Marine Institute (MI), Oranmore, Galway, Ireland

ARTICLE INFO

Article history:
Received 4 December 2014
Received in revised form 7 June 2016
Accepted 7 June 2016
Handled by P. He

Keywords:
Grey seal
Harbour seal
Gillnet
Tangle net
Bycatch
Mesh size
Mitigation measures

ABSTRACT

A dedicated observer programme was carried out in gillnet and entangling net fisheries off the west and southwest coasts of Ireland to monitor interactions with seals. No seals were observed as bycatch in gillnet fisheries suggesting the risk of bycatch in observed gillnet fisheries is low. Grey seals (*Halichoerus grypus*) and to a lesser extent harbour seals (*Phoca vitulina*) were observed as bycatch principally in large mesh tangle nets targeting crawfish (*Palinurus elephas*). Observed bycatch levels, proximity of grey seal colonies to crawfish fisheries and similar habitat preferences suggest that the risk of seal bycatch in tangle net fisheries for crawfish on the west and southwest coasts of Ireland is high. Factors affecting bycatch in tangle nets were modeled to investigate potential bycatch mitigation measures. Crawfish and monkfish (*Lophius* spp.) catches, depth of gear deployment and larger mesh size were significantly positively correlated with seal bycatch. Development of mitigation measures such as improved net visibility, use of smaller mesh size and reintroduction of pots has major potential to reduce seal bycatch in the observed tangle net fishery. Growing seal populations in regions where tangle netting for crawfish is most prevalent could be related to factors such as benefits accrued from depredation and possible immigration from adjacent populations in the UK. More explicit conservation objectives will likely be needed to provide an impetus for development of proposed mitigation measures and bycatch reductions in Ireland. Results of this study also have broader ramifications for management of pinniped bycatch in large mesh gillnet and entangling net fisheries, which are widespread but poorly studied in European Community waters.

© 2016 Elsevier B.V. All rights reserved.

1. Introduction

Two pinniped species are found in Irish waters, the harbour seal (*Phoca vitulina*) and the grey seal (*Halichoerus grypus*) (Fig. 1). The population of grey seals using the Irish coastline is part of a larger western European stock centred in northern Britain and stretching to western France, the eastern North Sea, the Faroe Islands, Iceland, Norway and the northwest coast of Russia (Bonner, 1972). There is currently no information on the genetic structure of grey seals using haul-out sites on the Irish coastline. The harbour seal occurs in Europe from the Arctic Ocean at Svalbard, Norway, to the Barents Sea, the southern Baltic Sea, and the eastern North Atlantic from the British Isles south to Portugal. Although yet to be proven, it is thought that harbour seals using terrestrial haul-out sites and the waters surrounding the island of Ireland are of the same genetic stock or population (Cronin et al., 2014).

Recent population surveys suggest that seal populations in Ireland are increasing: The grey seal population was estimated at 7824–9365 animals of all ages in 2012 compared with 5509–7083 in 2005. Growth in the grey seal breeding population appears to have continued since the mid 1990's and possibly dating to the early 1980's. Since 2005, this growth seems to be most pronounced around a number of breeding areas of key importance in a national context (Ó Cadhla et al., 2013). Based on population surveys carried out in the Republic of Ireland in 2003 (Cronin et al., 2007) and Northern Ireland in 2002 (Duck, 2006), the population of harbour seals for the entire island was estimated at 6950 in 2003. Recent aerial surveys resulted in counts exceeding 2003 figures by 18.1% (Duck and Morris, 2012).

Growing populations can lead to increasing levels of interactions with fishing activities. The issue of bycatch where animals suffer injury or mortality due to entanglement in fishing gear is of major concern where species are rare or endangered, eg. the Mediterranean monk seal (*Monachus monachus*) (Karamanlidis et al., 2008; Tudela, 2004). Bycatch also needs to be considered in relation to more abundant pinniped populations. Under the European Com-

* Corresponding author.
E-mail address: cosgrove@bim.ie (R. Cosgrove).

http://dx.doi.org/10.1016/j.fishres.2016.06.007
0165-7836/© 2016 Elsevier B.V. All rights reserved.

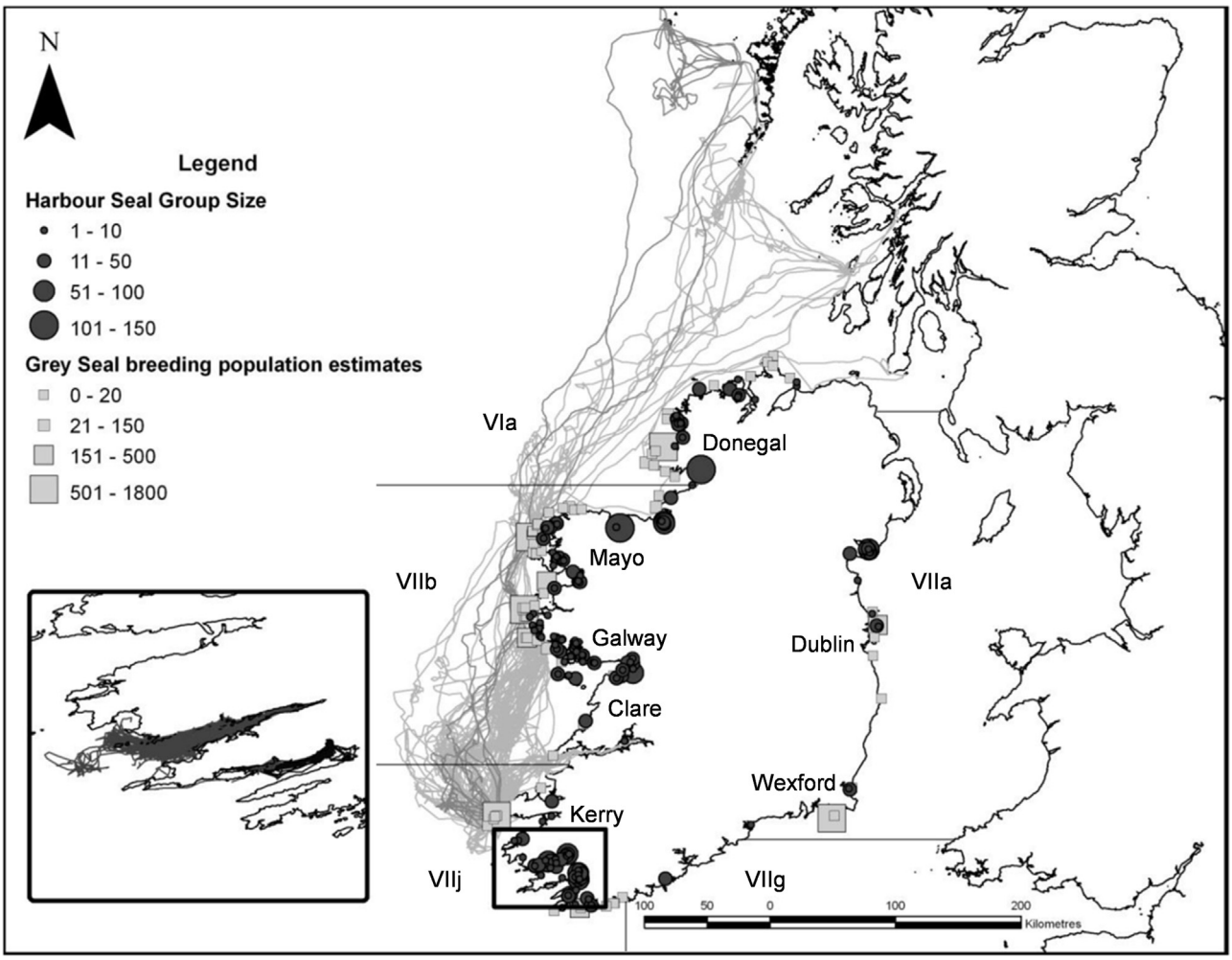

Fig. 1. Map of study areas including ICES divisions, best estimates of population size of harbour and grey seals in Ireland obtained in 2003 and 2005, respectively, and at sea distribution (lines) of tagged animals (reprinted and edited from Cronin et al., 2014 with permission from Elsevier).

munity (EC) Habitats Directive, member states are legally obliged to monitor and maintain all pinniped species at favourable conservation status. In terms of population status, this requires, that data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitat.

Gillnet and entangling net fisheries in Ireland primarily consist of gillnets, tangle nets and trammel nets (Gabriel et al., 2005). No recent studies have been carried out on bycatch of seals in such fisheries and there are remarkably few on-board observations and an absence of quantitative estimates in available literature on this issue. A total of 51 grey seals were brought ashore by vessels participating in the Mayo cod fishery from 1994 to 1996. Almost all animals were juvenile with an even sex ratio and although on-board observations were carried out, no quantitative estimates of bycatch rates were provided (BIM, 1997). Some 18 immature seals were landed by vessels as bycatch from a tangle net fishery targeting monkfish (*Lophius* spp.) in the southeast of the country in 1997 and 1998 but no associated fishing effort data were available (Kiely et al., 2000).

Estimation of total seal mortality rates from Irish gillnet and entangling net fisheries is not currently possible due to a variety of factors: Total effort data are incomplete due to the absence of logbook data on vessels under 10 m; Observer coverage is patchy and unrepresentative of national fishing effort as monitoring of gillnet and entangling nets in the Celtic Sea of the south coast of Ireland is not required under EC Regulation 812/2004; The primary vehicle for dedicated monitoring of bycatch of protected species in EC waters (European_Parliament, 2010), the latter regulation specifically requires monitoring of incidental captures of cetaceans, while bycatch estimates for species other than cetaceans are sporadic and not considered to be comprehensive (ICES, 2013a); Gaining access to gillnet and entangling net vessels can be problematic. No observer coverage was achieved on such vessels in Irish waters in the 3 years before this study (Cosgrove, 2013), but ancillary quantification of seal depredation (Cosgrove et al., 2015) facilitated access to vessels in the current study. Limited quantitative data can still be useful in assessing fisheries impacts on marine species through risk based approaches (Arrizabalaga et al., 2011; Fletcher, 2005; Goldsworthy and Page, 2007; Hobday et al., 2011; ICES, 2013b). Indeed, a risk assessment process is underway in Ireland to ensure that seals and other protected species occurring in Irish waters are conserved in line with requirements under the EC Habitats Directive (MI, 2013). Detailed information on bycatch rates from specific fisheries contributes greatly to such assessments.

This study aims to provide the first quantitative information on seal bycatch in Irish gillnet and entangling net fisheries. These data are used to model factors affecting bycatch to facilitate investigation of potential bycatch mitigation measures. In the absence of comprehensive quantitative information, we discuss risk levels of seal entanglement in specific gear types to facilitate fisheries risk assessment. We also discuss potential seal population impacts in the light of identified elevated bycatch risk.

Download English Version:

https://daneshyari.com/en/article/6385179

Download Persian Version:

https://daneshyari.com/article/6385179

Daneshyari.com